

SEQUENCE LISTING

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 Leadlay, Peter, F.
 McArthur, Hamish A.I.

<120> Polyketides and their synthesis

<130> 0380-P04095US00

<140> Not yet assigned

<141> Herewith

<150> PCT/GB2004/005001

<151> 2004-11-29

<150> GB0327721.7

<151> 2003-11-28

<160> 57

<170> PatentIn version 3.2

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<213> Streptomyces fradiae

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His Leu Asp Leu Phe Arg Ser Leu Leu Gly Glu Gly Asp Arg Leu Gly
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Leu Ser Ile Ser Tyr Ala Glu Gln Arg Glu Pro Arg Gly Ile Ala Glu
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Arg Leu Leu Ser Leu Glu Glu Lys Pro Arg Arg Pro Leu Glu Pro Gly
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 Glu Ala Phe Val Arg Thr Asn Val Glu Gly Thr Arg Val Leu Leu Gln
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 Ala Ala Val Asp Ala Gly Val Gly Arg Phe Val His Ile Ser Thr Asp
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 Glu Val Tyr Gly Ser Ile Ala Glu Gly Ser Trp Pro Glu Asp His Pro
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 Leu Ala Pro Asn Ser Pro Tyr Ala Ala Thr Lys Ala Ala Ser Asp Leu
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 Arg Cys Ser Asn Asn Tyr Gly Pro Arg Gln Tyr Pro Glu Lys Ala Val
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 Gly Asp Gly Gly Asn Thr Arg Glu Trp Leu His Val Asp Asp His Cys
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 Arg Gly Val Ala Leu Val Ala Ala Gly Gly Arg Pro Gly Val Ile Tyr
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 Asn Ile Gly Gly Gly Thr Glu Leu Thr Asn Ala Glu Leu Thr Asp Arg
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 Ile Leu Glu Leu Cys Gly Ala Asp Arg Ser Ala Val Arg Arg Val Ala
 260 265 270
 Asp Arg Pro Gly His Asp Arg Arg Tyr Ser Val Asp Thr Thr Lys Ile
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 Arg Glu Glu Leu Gly Tyr Ala Pro Arg Thr Gly Ile Thr Glu Gly Leu
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35 40 45

Glu His Val Ala Gly His Pro Asp Leu Glu Phe Val Arg Gly Asp Ile
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Ala Asp His Gly Trp Trp Arg Arg Leu Met Glu Gly Val Gly Leu Val
65 70 75 80

Val His Phe Ala Ala Glu Ser His Val Asp Arg Ser Ile Glu Ser Ser
85 90 95

Glu Ala Phe Val Arg Thr Asn Val Glu Gly Thr Arg Val Leu Leu Gln
100 105 110

Ala Ala Val Asp Ala Gly Val Gly Arg Phe Val His Ile Ser Thr Asp
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Glu Val Tyr Gly Ser Ile Ala Glu Gly Ser Trp Pro Glu Asp His Pro
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Val Ala Pro Asn Ser Pro Tyr Ala Ala Thr Lys Ala Ala Ser Asp Leu
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Leu Ala Leu Ala Tyr His Arg Thr Tyr Gly Leu Asp Val Arg Val Thr
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Arg Cys Ser Asn Asn Tyr Gly Pro Arg Gln Tyr Pro Glu Lys Ala Val
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Gly Asp Gly Gly Asn Thr Arg Glu Trp Leu His Val Asp Asp His Cys
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 Asn Ile Gly Gly Gly Thr Glu Leu Thr Asn Ala Glu Leu Thr Asp Arg
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 260 265 270
 Asp Arg Pro Gly His Asp Arg Arg Tyr Ser Val Asp Thr Thr Lys Ile
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tcctgggaac	acgccctcgg	acagcagacg	atcatgtcgg	ccatgtgctt	ctcgccgctg	1680
aacggcgaca	gcaccatcga	cgacatgggtg	gcgctggccc	gttcctggaa	accggacctc	1740
gtcctgtggg	agcccttcac	ctacgcggga	cccgtcgccg	cgcacgcctg	cggcgccgcc	1800
cacgcccggc	tgctgtgggg	tcccgcagtg	gtcctcaacg	cacggcggca	gttcacccgg	1860
ctgctcgccg	agcgcctcgt	cgaacagcgc	gaggacccgg	tcggcgaatg	gtcacgtgg	1920
acgctggagc	gccacggcct	cgccgccgac	gcggacacga	tcgaggaact	gttcgcccgg	1980
cagtggacga	tcgaccccag	cgccgggagc	ctgcggctgc	cggtcgacgg	cgaggtcgtg	2040
cccatgcgct	tcgtgccgta	caacggcgcc	tcggtcgtcc	ccgcctggct	ctccgagccg	2100
cctgcccggc	cccgggtctg	cgtcacccctc	ggcgtctcca	cccgggagac	ctacggcacg	2160

gacggcgtcc cgttccacga actgctggcc ggactggccg acgtggacgc cgagatcgtc 2220
gccaccctcg acgcggggca gctcccggac gccgccggtc tgcccggcaa tgtgcgcgtc 2280
gtcgaattcg tgccgctgga cgccctgctg ccgagctgcg ccgcgatcgt ccaccacgga 2340
ggcgcgggaa cctgtttcac ggccaccgtg cacggcgtcc cgagatcgt cgtggcctcc 2400
ctctgggacg cgccgctgaa ggcgaccaa ctcgccgagg cgggcgccgg gatcgccctg 2460
gaccccgggg aactgggcgt ggacaccctg cgcggcgccg tcgtgcgggt gctggagagc 2520
cgcgagatgg ccgtggcggc gcgtgcctc gccgacgaga tgctcgccgc cccaccccg 2580
gccgcgctcg tccccgcct cgaacgcctc accgccgcgc accgccgcgc ctgatcccg 2640
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caccagggaa agggcaagga ctaccggcg gaggccgagg agctggccgc gcttgtcacc 2760
cagcgccgcc ccggggcccg ctccctcctc gacgtggcct gcggaacggg gatgcacctg 2820
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gaccagcggg aactggacgc ggcgatcggc cggttcgccg cgcacctgcc gtccggcggg 3060
gtcgtgatcg tcgatccctg gtggttcccg gagacgttca caccggggta cgtcggcgcg 3120
agcctcgtcg aggccgagg ccgcaccatc gcgcgcttct cccactccgc gctcgaggac 3180
ggcgcgaccc ggatcgatgt ggactacctc gtcggcgtgc cgggggaggg ggtgcggcac 3240
ttgaaggaga cccatcgat cacgcttttc gggcgtgcgc agtacgaggc ggccttcacc 3300
gcggcgggga tgtccgtcga gtacctcccg cacgccgcca ccgaccgcgg actcttcgtc 3360
ggcgtccagg cctga 3375

<210> 8
<211> 295
<212> PRT
<213> Streptomyces eurythermus
<400> 8

Met Lys Gly Ile Ile Leu Ala Gly Gly Ser Gly Thr Arg Leu Arg Pro
1 5 10 15
Leu Thr Gly Ala Leu Ser Lys Gln Leu Leu Pro Val Tyr Asp Lys Pro
20 25 30
Met Ile Tyr Tyr Pro Leu Ser Val Leu Met Leu Ala Gly Ile Arg Asp
35 40 45
Ile Gln Ile Ile Thr Ser Lys Thr His Leu Glu Met Phe Arg Ser Leu
50 55 60
Leu Gly Asp Gly Ser Arg Ile Gly Ile Ser Val Gly Tyr Ala Glu Gln
65 70 75 80

Glu Glu Pro Arg Gly Ile Ala Glu Ala Phe Leu Ile Gly Glu Glu His
85 90 95

Ile Gly Asp Asp Pro Val Ala Leu Ile Leu Gly Asp Asn Val Phe His
100 105 110

Gly Pro Gly Phe Ser Ser Val Leu Ala Ser Thr Ala Ala Arg Leu Asp
115 120 125

Gly Cys Glu Leu Phe Gly Tyr Pro Val Lys Asp Pro Arg Arg Tyr Gly
130 135 140

Val Gly Glu Val Asp Ala Glu Gly Arg Leu Val Ser Leu Glu Glu Lys
145 150 155 160 165

Pro Glu Lys Pro Arg Ser His Leu Ala Val Thr Gly Leu Tyr Phe Tyr
165 170 175

Asp Asn Gly Val Val Asp Ile Ala Arg Arg Leu Thr Pro Ser Pro Arg
180 185 190

Gly Glu Leu Glu Ile Thr Asp Val Asn Lys Val Tyr Leu Glu Gln Gly
195 200 205

Arg Ala Arg Met Thr Glu Leu Gly Arg Gly Phe Ala Trp Leu Asp Met
210 215 220

Gly Thr His Ser Ser Leu Leu Gln Ala Gly Gln Tyr Val Gln Leu Leu
225 230 235 240

Glu Gln Arg Gln Gly Val Arg Ile Ser Cys Val Glu Glu Ile Ala Leu
245 250 255

Arg Met Gly Tyr Ile Ser Ala Arg Gln Cys His Glu Leu Gly Arg Glu
260 265 270

Leu Glu Ser Ser Ser Tyr Gly Arg Tyr Leu Met Asp Val Ala Glu Thr
275 280 285

Leu Met Ser Gly Pro Ala Ala
290 295

<210> 9
<211> 332
<212> PRT
<213> Streptomyces eurythermus

<400> 9

Met Arg Leu Leu Val Thr Gly Gly Ala Gly Phe Ile Gly Ser His Phe
1 5 10 15

Val Arg Gln Leu Leu Ala Gly Ala Tyr Pro Asp Leu Ala Gly Ala Arg
12

Ala Asp Thr Val Arg Trp Tyr Ala Glu Asn Arg Ala Trp Trp Glu Pro
 305 310 315 320

Leu Lys Lys Ala Ala Gln Glu Ala Arg Arg Thr Asp
 325 330

<210> 10
 <211> 787
 <212> PRT
 <213> Streptomyces eurythermus

<400> 10

Val Ser Thr Pro Ser Ala Pro Pro Val Pro Gly Ala Pro Ser Pro Ala
 1 5 10 15

Gly His Pro Asp Glu Gly Leu Trp Val Arg Arg Tyr Arg Pro Val Arg
 20 25 30

Asp Pro Glu Leu Arg Leu Val Cys Phe Pro His Ala Gly Gly Ala Ala
 35 40 45

Thr Ser Phe Ala Ala Leu Ala Arg Gly Leu Asp Glu Thr Val Glu Ala
 50 55 60

Leu Ala Val Gln Tyr Pro Gly Arg Gln Asp Arg Arg His Glu Pro Phe
 65 70 75 80

Ile Pro Ser Ile Ser Gly Leu Val Asp Gln Val Val Pro Glu Ile Leu
 85 90 95

Arg Trp Ala Asp Arg Pro Leu Ala Leu Phe Gly His Ser Met Gly Ala
 100 105 110

Thr Val Ala Phe Glu Val Ala Arg Arg Leu Arg Gly Ser Gly Gln Ala
 115 120 125

Ser Pro Val His Leu Leu Val Ser Gly Arg Arg Ala Pro Thr Val Arg
 130 135 140

Arg Arg Asp Val Ala His Leu Leu Asp Asp Asp Ala Leu Ile Ala Glu
 145 150 155 160

Ile Ala Thr Leu Gln Gly Thr Glu Asp Ala Val Leu Gln Asp Glu Glu
 165 170 175

Leu Leu Arg Leu Ala Leu Pro Ala Ile Arg Asn Asp Tyr Arg Ala Ala
 180 185 190

Gly Thr Tyr Ala Tyr Val Pro Gly Gly Ala Leu Asp Cys Pro Val Thr
 195 200 205

Val Leu Thr Gly Asp Arg Asp Pro Asp Val Pro Leu Glu Glu Ala Arg
210 215 220

Ala Trp Arg Glu Leu Thr Thr Gly Pro Phe Ala Leu His Thr Phe Ala
225 230 235 240

Gly Gly His Phe Tyr Leu Asn Asp Arg Met Asp Glu Val Cys Arg Thr
245 250 255

Ile Gly Asp Ala Leu Ala Gly Thr Ala Thr Ala Asp Thr Ala Thr Gly
260 265 270

Thr Val Pro Pro Arg Thr Ala Ala Asp Thr Ser Thr Gly Pro Val Pro
275 280 285

Pro Arg Thr Ala Ala Asp Thr Ala Arg Glu Pro Val Pro Pro Arg Ser
290 295 300

Ala Pro Ala Pro His Gly Ala Ala Arg Arg Arg Ala Asp Ala Val Arg
305 310 315 320

Pro Gly Asp Pro Val Asp Thr Ala Arg Arg Val Leu Val Ser Ala Arg
325 330 335

Thr Ala Asp Ser Ala Val Thr Pro Phe Asp Gly Ile Ser Gly Trp Leu
340 345 350

Ala Glu Arg Leu Arg Ala Gly Arg Phe Asp Val Ser Arg Val Pro Phe
355 360 365

Ala Glu Leu Arg Gly Trp Ser Phe His Pro Gly Thr Gly Asn Leu His
370 375 380

His Ala Ser Gly Arg Phe Phe Ser Val Glu Gly Leu His Val Arg Thr
385 390 395 400

Asp Arg Leu Pro Glu Arg Gly Trp Thr Gln Pro Ile Ile Val Gln Pro
405 410 415

Glu Val Gly Leu Leu Gly Ile Val Ala Arg Glu Ile Asp Gly Val Leu
420 425 430

His Phe Leu Met Gln Ala Lys Met Glu Pro Gly Asn Val Asn Val Leu
435 440 445

Gln Val Ser Pro Thr Val Gln Ala Thr Arg Ser Asn Phe Thr Gly Val
450 455 460

His Arg Gly Arg Asp Ile Arg Tyr Leu Asp Leu Phe Met Gly Pro Arg
465 470 475 480

Arg Ala Arg Val Leu Val Asp Ser Ile Gln Ser Glu Gln Ala Asp Trp
15

485										490					495				
Phe	Leu	Ala	Lys 500	Arg	Asn	Arg	Asn	Met 505	Ile	Val	Glu	Leu	Ala 510	Ala	Asp				
Asp	Asp	Leu 515	Asp	Ile	Gly	Glu	Asp 520	Phe	Arg	Trp	Leu	Thr 525	Leu	Gly	Gln				
Leu	Arg 530	Arg	Leu	Leu	Met	Leu 535	Asp	Asn	Val	Val	Asn 540	Met	Asp	Ala	Arg				
Ser 545	Ile	Leu	Ala	Cys	Leu 550	Pro	Thr	Ala	Asp	Ala 555	Asp	Ala	Ser	Ala	Pro 560				
Ser	Pro	Val	Leu	Arg 565	Ser	Phe	Phe	Gly	Ser 570	Pro	Gly	Ala	Ala	Arg 575	His				
Thr	Thr	Ala	Glu 580	Val	Leu	Thr	Trp	Phe 585	Thr	Gly	Val	Arg	Ala 590	Leu	Arg				
Glu	Leu	Val 595	Gln	Asn	Arg	Val	Pro 600	Leu	Asp	Thr	Val	Thr 605	Ala	Asp	Gly				
Trp	Tyr 610	Arg	Thr	Pro	His	Glu 615	Ile	Ala	His	Glu	Ser 620	Gly	Arg	His	Phe				
Arg 625	Val	Met	Ala	Ala	Glu 630	Val	Ser	Ala	Ser	Ser 635	Arg	Glu	Val	Thr	Ser 640				
Trp	Thr	Gln	Pro	Leu 645	Ile	Glu	Pro	Arg	Leu 650	Pro	Gly	Leu	Met	Ala 655	Leu				
Leu	Val	Lys	Ser 660	Val	Asp	Gly	Val	Leu 665	His	Ala	Leu	Val	Arg 670	Ala	Arg				
Val	Asp	Val 675	Gly	His	Leu	Asn	Val 680	Ala	Glu	Leu	Ala	Pro 685	Thr	Val	Gln				
Cys	Arg 690	Pro	Gln	Glu	His	Thr 695	Gly	Pro	Arg	Gly	Leu 700	Pro	Gly	Pro	Pro				
Tyr 705	Leu	Glu	Asp	Val	Leu 710	Ser	Ala	Pro	Pro	Gln 715	Asp	Val	Arg	Tyr	Asp 720				
Ala	Val	Gln	Ser	Glu 725	Glu	Gly	Gly	Arg	Phe 730	Phe	His	Ala	Gln	Asn 735	Arg				
Tyr	Val	Ile	Val 740	Glu	Val	Pro	His	Asp 745	Phe	Pro	Glu	Asp	Ala 750	Pro	Asp				
Asp	Phe	Ala 755	Trp	Leu	Ser	Leu	Gly 760	Gln	Leu	Thr	Gly	Leu 765	Leu	Ala	His				

Gly Asn Tyr Leu Asn Ile Glu Leu Arg Thr Leu Val Ala Cys Ala His
 770 775 780

Thr Leu Tyr
 785

<210> 11
 <211> 333
 <212> PRT
 <213> Streptomyces eurythermus
 <400> 11

Met Val Asn Asp Pro Met Pro Arg Gly Ser Gly Ser Gly Ser Val Val
 1 5 10 15

Val Leu Gly Gly Ala Gly Tyr Val Gly Arg His Val Cys Ala Ala Phe
 20 25 30

Ala Ala Arg Gly Arg Asp Val Val Val Val Gly Arg Arg Pro Pro Glu
 35 40 45

Glu Pro Met Pro Tyr Arg Cys Val Thr Leu Asp Leu Ala Gly Thr Asp
 50 55 60

Pro Ala Ala Leu Ala Ala Ala Leu Asp Ala Glu Arg Pro Asp Thr Ile
 65 70 75 80

Val Asn Ser Val Gly Ser Ile Trp Gly Arg Thr Asp Glu Gln Met Trp
 85 90 95

Ser Ala Thr Ala Val Pro Thr Leu Arg Leu Leu Glu Ala Leu Ala Leu
 100 105 110

Met Ser Ala Arg Pro Arg Leu Val His Leu Gly Ser Val Leu Glu Tyr
 115 120 125

Gly Pro Val Thr Pro Gly Gly Ser Val Gly Ala Asp Ala Val Pro Arg
 130 135 140

Pro Asp Thr Ala Tyr Gly Arg Ser Lys Leu Ala Ala Ser Glu Ala Val
 145 150 155 160

Leu Arg Gly Thr Ser Gly Gly Trp Val Asp Gly Val Val Leu Arg Val
 165 170 175

Ser Asn Val Ser Gly Pro Gly Thr Pro Arg Ile Ser Leu Leu Gly Gln
 180 185 190

Val Ala Glu Arg Leu Leu Ala Ala Ala Gly Thr Gly Ala Glu Ala Val
 195 200 205

Val Glu Leu Ser Arg Leu Arg Ala His Arg Asp Tyr Val Asp Val Arg
210 215 220

Asp Val Ala Asp Ala Val Val Ala Ala Ala Arg Ala Pro Ala Val Pro
225 230 235 240

Val Ala Val Gly Ile Gly Arg Gly Glu Ala Val Ala Val Arg Asp Leu
245 250 255

Val Gly Leu Phe Ile Glu Ala Ser Gly Ile Pro Ala Arg Val Val Glu
260 265 270

Arg Pro Ala Pro Gly Arg Ala Pro Gly His Arg Glu Asp Trp Leu Arg
275 280 285

Val Asp Thr Gly Ala Ala Arg Ala Leu Leu Gly Trp Ala Pro Arg Arg
290 295 300

Ser Leu Arg Glu Ser Val Arg Asp Cys Trp His Asp Leu Val Arg Ala
305 310 315 320

His Arg Leu Pro Thr Thr Pro Ser Lys His Ser Gly Gly
325 330

<210> 12
<211> 373
<212> PRT
<213> Streptomyces eurythermus

<400> 12

Val Thr Thr Tyr Val Trp Asp Tyr Leu Ala Glu Tyr Gln Asn Glu Arg
1 5 10 15

Ala Asp Leu Leu Asp Ala Val Glu Thr Val Phe Ala Ser Gly Gln Leu
20 25 30

Val Leu Gly Pro Ser Val Asp Gly Phe Glu Lys Glu Phe Ala Asp Tyr
35 40 45

His Gly Leu Arg His Cys Gly Gly Val Asp Asn Gly Thr Asn Ala Val
50 55 60

Lys Leu Gly Leu Gln Ala Leu Gly Val Gly Pro Gly Asp Glu Val Val
65 70 75 80

Thr Val Ser Asn Thr Ala Ala Pro Thr Val Val Ala Ile Asp Gly Thr
85 90 95

Gly Ala Thr Pro Val Phe Val Asp Val Arg Ala Glu Asp His Leu Met
100 105 110

Asp Thr Asp Gln Val Ala Asp Val Ile Thr Pro Arg Thr Lys Ala Leu
115 120 125

Leu Pro Val His Leu Tyr Gly Gln Cys Val Asp Met Ala Pro Leu Arg
 130 135 140
 Ala Leu Ala Glu Gln His Gly Leu Val Val Leu Glu Asp Cys Ala Gln
 145 150 155 160
 Ala His Gly Ala Arg His His Gly Glu Leu Ala Gly Thr Leu Gly Asp
 165 170 175
 Ala Ala Ala Phe Ser Phe Tyr Pro Thr Lys Val Leu Gly Ala Tyr Gly
 180 185 190
 Asp Gly Gly Ala Val Leu Thr Asp Asp Ala Asp Val Asp Arg Ala Leu
 195 200 205
 Arg Arg Leu Arg Tyr Tyr Gly Met Glu Asp Val Tyr Tyr Val Val Gln
 210 215 220
 Thr Pro Gly His Asn Ser Arg Leu Asp Glu Val Gln Ala Glu Ile Leu
 225 230 235 240
 Arg Arg Lys Leu Thr Arg Leu Asp Arg Tyr Ile Glu Gly Arg Arg Ala
 245 250 255
 Val Ala Arg Arg Tyr Ala Glu Gly Leu Ala Asn Leu Thr Gly Pro Gly
 260 265 270
 Gly Leu Val Leu Pro Ser Val Thr Glu Gly Asn Asp His Val Tyr Tyr
 275 280 285
 Val Tyr Val Val Arg His Pro Arg Arg Asp Asp Ile Ile Glu Ala Leu
 290 295 300
 Lys Ser Tyr Gly Ile Ser Leu Asn Ile Ser Tyr Pro Trp Pro Val His
 305 310 315 320
 Thr Met Thr Gly Phe Ala His Leu Gly Tyr Ala Lys Gly Ser Leu Pro
 325 330 335
 Val Thr Glu Arg Leu Ala Asp Glu Ile Phe Ser Leu Pro Met Tyr Pro
 340 345 350
 Gly Leu Ala Pro Asp Val Gln Asp Lys Val Ile Ala Ala Leu His Glu
 355 360 365
 Val Leu Ala Thr Leu
 370

<210> 13
 <211> 447
 <212> PRT

<213> Streptomyces eurythermus

<400> 13

Val Ser Pro Ala Pro Ala Thr Glu Asp Pro Ala Ala Ala Gly Arg Arg
1 5 10 15
Leu Gln Leu Thr Arg Ala Ala Gln Trp Phe Ala Gly Thr Gln Asp Asp
20 25 30
Pro Tyr Ala Leu Val Leu Arg Ala Glu Ala Thr Asp Pro Ala Pro Tyr
35 40 45
Glu Glu Arg Ile Arg Ala His Gly Pro Leu Phe Arg Ser Asp Leu Leu
50 55 60
Asp Thr Trp Val Thr Ala Ser Arg Ala Val Ala Asp Glu Val Ile Thr
65 70 75 80
Ser Pro Ala Phe Asp Gly Leu Thr Ala Asp Gly Arg Arg Pro Gly Ala
85 90 95
Arg Glu Leu Pro Leu Ser Gly Thr Ala Leu Asp Ala Asp Arg Ala Thr
100 105 110
Cys Ala Arg Phe Gly Ala Leu Thr Ala Trp Gly Gly Pro Leu Leu Pro
115 120 125
Ala Pro His Glu Arg Ala Leu Arg Glu Ser Ala Glu Arg Arg Ala His
130 135 140
Thr Leu Leu Asp Gly Ala Glu Ala Ala Leu Ala Ala Asp Gly Thr Val
145 150 155 160
Asp Leu Val Asp Ala Tyr Ala Arg Arg Leu Pro Ala Leu Val Leu Arg
165 170 175
Glu Gln Leu Gly Val Pro Glu Glu Ala Ala Thr Ala Phe Glu Asp Ala
180 185 190
Leu Ala Gly Cys Arg Arg Thr Leu Asp Gly Ala Leu Cys Pro Gln Leu
195 200 205
Leu Pro Asp Ala Val Ala Gly Val Arg Ala Glu Ala Ala Leu Thr Ala
210 215 220
Val Leu Ala Ser Ala Leu Arg Gly Thr Pro Ala Gly Arg Ala Pro Asp
225 230 235 240
Ala Val Ala Ala Ala Arg Thr Leu Ala Val Ala Ala Ala Glu Pro Ala
245 250 255
Ala Thr Leu Val Gly Asn Ala Val Gln Glu Leu Leu Ala Arg Pro Ala
20

	260		265		270
	Gln Trp Ala 275	Glu Leu Val Arg Asp 280	Pro Arg Leu Ala 285	Ala Ala Ala Val	
•	Thr Glu 290	Thr Leu Arg Val Ala 295	Pro Pro Val Arg Leu 300	Glu Arg Arg Val	
	Ala Arg Glu Asp Thr 305	Asp Ile Ala Gly Gln 310 315	Arg Leu Pro Ala Gly Gly 320		
	Ser Val Val Ile 325	Leu Val Ala Ala Val Asn 330	Arg Ala Pro Val Ser Ala 335		
	Gly Ser Asp Ala 340	Ser Thr Thr Val Pro 345	His Ala Gly Gly Arg 350	Pro Arg	
	Thr Ser Ala 355	Pro Ser Val Pro Ser 360	Ala Pro Phe Asp Leu 365	Thr Arg Pro	
	Val Ala 370	Ala Pro Gly Pro Phe 375	Gly Leu Pro Gly Asp 380	Leu His Phe Arg	
	Leu 385	Gly Gly Pro Leu Val 390	Gly Thr Val Ala Glu 395	Ala Ala Leu Gly Ala 400	
	Leu Ala Ala Arg 405	Leu Pro Gly Leu Arg Ala 410	Ala Gly Pro Ala Val Arg 415		
	Arg Arg Arg Ser 420	Pro Val Leu His Gly 425	His Ala Arg Leu Pro 430	Val Ala	
	Val Ala Arg 435	Thr Ala Arg Asp Leu 440	Pro Ala Thr Ala Pro 445	Arg Asn	
<210>	14				
<211>	424				
<212>	PRT				
<213>	Streptomyces eurythermus				
<400>	14				
	Met Arg Ile Leu 1	Leu Thr Ser Phe Ala 5	His Asn Thr His Tyr 10 15	Tyr Asn	
	Leu Val Pro 20	Leu Gly Trp Ala Leu 25	Arg Ala Ala Gly His Asp 30	Val Arg	
	Val Ala Ser 35	Gln Pro Ser Leu Thr 40	Gly Thr Ile Thr Gly 45	Ser Gly Leu	
	Thr Ala Val 50	Pro Val Gly Asp 55	Asp Thr Ala Ile Val 60	Glu Leu Ile Thr	

Glu Ile Gly Asp Asp Leu Val Leu Tyr Gln Gln Gly Met Asp Phe Val
 65 70 75 80
 Asp Thr Arg Asp Glu Pro Leu Ser Trp Glu His Ala Leu Gly Gln Gln
 85 90 95
 Thr Ile Met Ser Ala Met Cys Phe Ser Pro Leu Asn Gly Asp Ser Thr
 100 105 110
 Ile Asp Asp Met Val Ala Leu Ala Arg Ser Trp Lys Pro Asp Leu Val
 115 120 125
 Leu Trp Glu Pro Phe Thr Tyr Ala Gly Pro Val Ala Ala His Ala Cys
 130 135 140
 Gly Ala Ala His Ala Arg Leu Leu Trp Gly Pro Asp Val Val Leu Asn
 145 150 155 160
 Ala Arg Arg Gln Phe Thr Arg Leu Leu Ala Glu Arg Pro Val Glu Gln
 165 170 175
 Arg Glu Asp Pro Val Gly Glu Trp Leu Thr Trp Thr Leu Glu Arg His
 180 185 190
 Gly Leu Ala Ala Asp Ala Asp Thr Ile Glu Glu Leu Phe Ala Gly Gln
 195 200 205
 Trp Thr Ile Asp Pro Ser Ala Gly Ser Leu Arg Leu Pro Val Asp Gly
 210 215 220
 Glu Val Val Pro Met Arg Phe Val Pro Tyr Asn Gly Ala Ser Val Val
 225 230 235 240
 Pro Ala Trp Leu Ser Glu Pro Pro Ala Arg Pro Arg Val Cys Val Thr
 245 250 255
 Leu Gly Val Ser Thr Arg Glu Thr Tyr Gly Thr Asp Gly Val Pro Phe
 260 265 270
 His Glu Leu Leu Ala Gly Leu Ala Asp Val Asp Ala Glu Ile Val Ala
 275 280 285
 Thr Leu Asp Ala Gly Gln Leu Pro Asp Ala Ala Gly Leu Pro Gly Asn
 290 295 300
 Val Arg Val Val Asp Phe Val Pro Leu Asp Ala Leu Leu Pro Ser Cys
 305 310 315 320
 Ala Ala Ile Val His His Gly Gly Ala Gly Thr Cys Phe Thr Ala Thr
 325 330 335

Val His Gly Val Pro Gln Ile Val Val Ala Ser Leu Trp Asp Ala Pro
340 345 350

Leu Lys Ala His Gln Leu Ala Glu Ala Gly Ala Gly Ile Ala Leu Asp
355 360 365

Pro Gly Glu Leu Gly Val Asp Thr Leu Arg Gly Ala Val Val Arg Val
370 375 380

Leu Glu Ser Arg Glu Met Ala Val Ala Ala Arg Arg Leu Ala Asp Glu
385 390 395 400

Met Leu Ala Ala Pro Thr Pro Ala Ala Leu Val Pro Arg Leu Glu Arg
405 410 415

Leu Thr Ala Ala His Arg Arg Ala
420

<210> 15
<211> 240
<212> PRT
<213> Streptomyces eurythermus

<400> 15

Met Asn Leu Glu Tyr Ser Gly Asp Ile Ala Arg Leu Tyr Asp Leu Val
1 5 10 15

His Gln Gly Lys Gly Lys Asp Tyr Arg Ala Glu Ala Glu Glu Leu Ala
20 25 30

Ala Leu Val Thr Gln Arg Arg Pro Gly Ala Arg Ser Leu Leu Asp Val
35 40 45

Ala Cys Gly Thr Gly Met His Leu Arg His Leu Gly Asp Leu Phe Glu
50 55 60

Glu Val Ala Gly Val Glu Met Ser Pro Asp Met Leu Ala Ile Ala Gln
65 70 75 80

Arg Arg Asn Pro Glu Ala Gly Ile His Arg Gly Asp Met Arg Asp Phe
85 90 95

Ala Leu Gly Arg Arg Phe Asp Ala Val Ile Cys Met Phe Ser Ser Ile
100 105 110

Gly His Met Arg Asp Gln Arg Glu Leu Asp Ala Ala Ile Gly Arg Phe
115 120 125

Ala Ala His Leu Pro Ser Gly Gly Val Val Ile Val Asp Pro Trp Trp
130 135 140

Phe Pro Glu Thr Phe Thr Pro Gly Tyr Val Gly Ala Ser Leu Val Glu
145 150 155 160

Ala Glu Gly Arg Thr Ile Ala Arg Phe Ser His Ser Ala Leu Glu Asp
165 170 175

Gly Ala Thr Arg Ile Asp Val Asp Tyr Leu Val Gly Val Pro Gly Glu
180 185 190

Gly Val Arg His Leu Lys Glu Thr His Arg Ile Thr Leu Phe Gly Arg
195 200 205

Ala Gln Tyr Glu Ala Ala Phe Thr Ala Ala Gly Met Ser Val Glu Tyr
210 215 220

Leu Pro His Ala Ala Thr Asp Arg Gly Leu Phe Val Gly Val Gln Ala
225 230 235 240

<210> 16
<211> 72
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 16
ggggaattca gatctggtct agaggtcagc cggcgtggcg gcgcgtgagt tcctccagtc 60
gcgggacgat ct 72

<210> 17
<211> 38
<212> DNA
<213> Artificial

<220>
<223> Primer

<400> 17
gggcatatga acgaccgtcc ccgccgcgcc atgaaggg 38

<210> 18
<211> 50
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 18
cccctctaga ggtcactgtg cccggctgtc ggcgggcgcc ccgcgcatgg 50

<210> 19
<211> 52
<212> DNA
<213> Artificial

<220>
<223> primer

<400> 19

cccctctaga ggtcatgcgc gctccagttc cctgccgcc ggggaccgct tg 52

 <210> 20
 <211> 81
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 20
 ggggtctagat cgattaatta aggaggacat tcatgcgcgt cctgggtgacc ggaggtgcgg 60
 gcttcatcgg ctcgcacttc a 81

 <210> 21
 <211> 40
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 21
 gggcatatgt acgagggcgg gttcgccgag ctttacgacc 40

 <210> 22
 <211> 40
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 22
 ggggtctaga ggtcatccgc gcacaccgac gaacaacccg 40

 <210> 23
 <211> 38
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 23
 gggcatatgg cggcgagcac tacgacggag gggaatgt 38

 <210> 24
 <211> 38
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 24
 ggggtctagag gtcacgggtg gctcctgccg gccctcag 38

 <210> 25
 <211> 22
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 25
 catcgtcaag gagttcgacg gt 22

<210> 26
 <211> 21
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 26
 gccagctcgg cgacgtccat c 21

<210> 27
 <211> 35
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 27
 gggcatatga gccccgcacc cgccaccgag gaccc 35

<210> 28
 <211> 42
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 28
 ggtctagagg tcagttccgc ggtgcggtgg cgggcaggtc ac 42

<210> 29
 <211> 41
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 29
 gggcatatgc gtatcctgct gacgtcgttc gcgcacaaca c 41

<210> 30
 <211> 44
 <212> DNA
 <213> Artificial

<220>
 <223> primer
 <400> 30
 ggtctagagg tcaggcgcgg cggtgcgcgg cggtgaggcg ttcg 44

<210> 31

<211> 39
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 31
 ggagatctgg cgcggcggtg cgcggcggtg aggcgttcg 39

<210> 32
 <211> 42
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 32
 gggcatatga acctcgaata cagcggcgac atcgcccggg tg 42

<210> 33
 <211> 44
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 33
 ggtctagagg tcaggcctgg acgccgacga agagtccgcg gtcg 44

<210> 34
 <211> 37
 <212> DNA
 <213> Artificial

 <220>
 <223> primer

 <400> 34
 gggcatatga ctacctacgt ctgggactac ctggcg 37

<210> 35
 <211> 40
 <212> DNA
 <213> Artificial

 <220>
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